



JAN – JUN, 2020

PBCS Monitoring Report in Fukuoka FIR

Presented by **Fumihito** Nakabayashi

Network Performance Assessment Center , JCAB

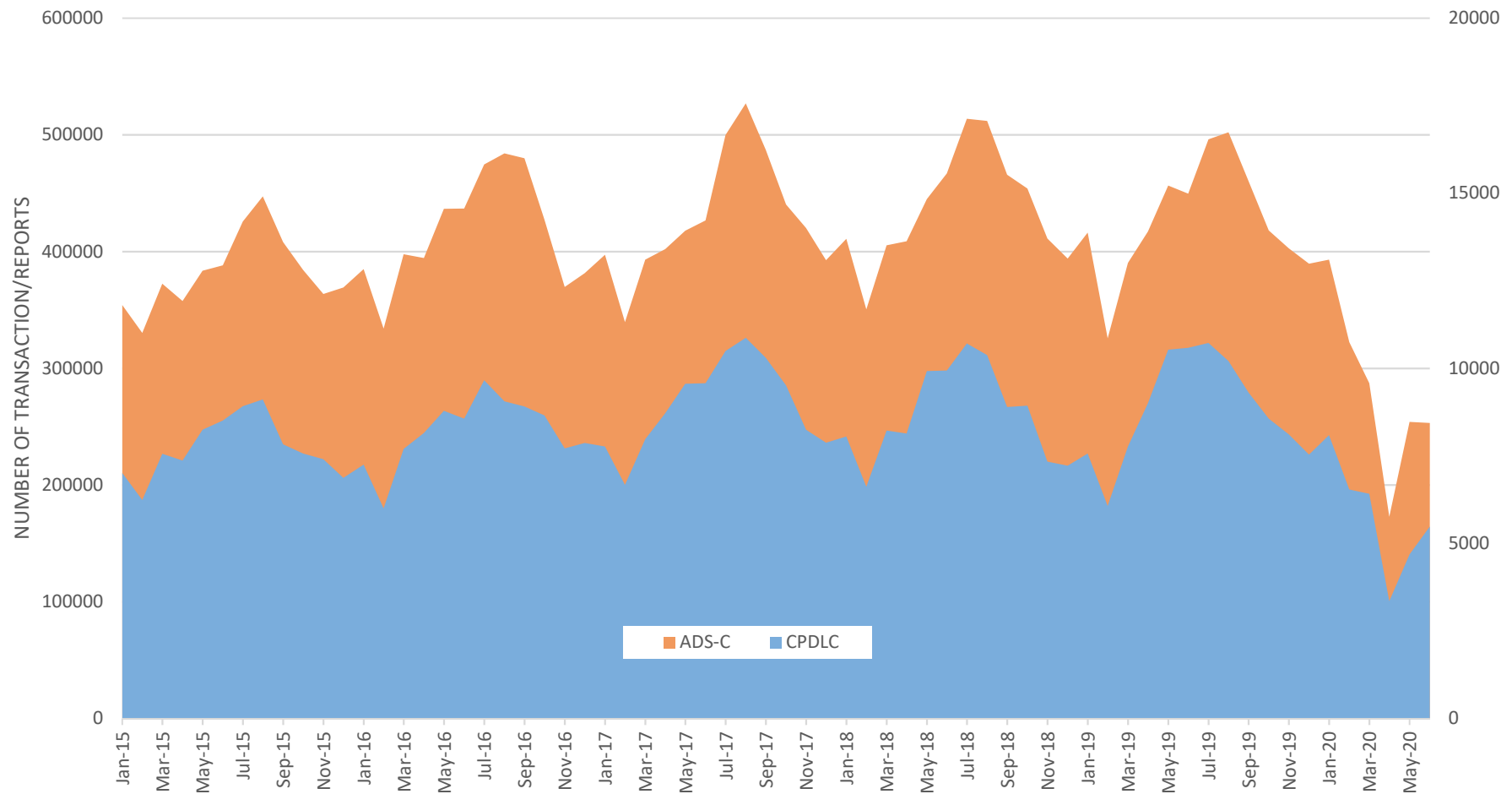


IPACG46/FIT33
15 thru 16 Oct, 2020

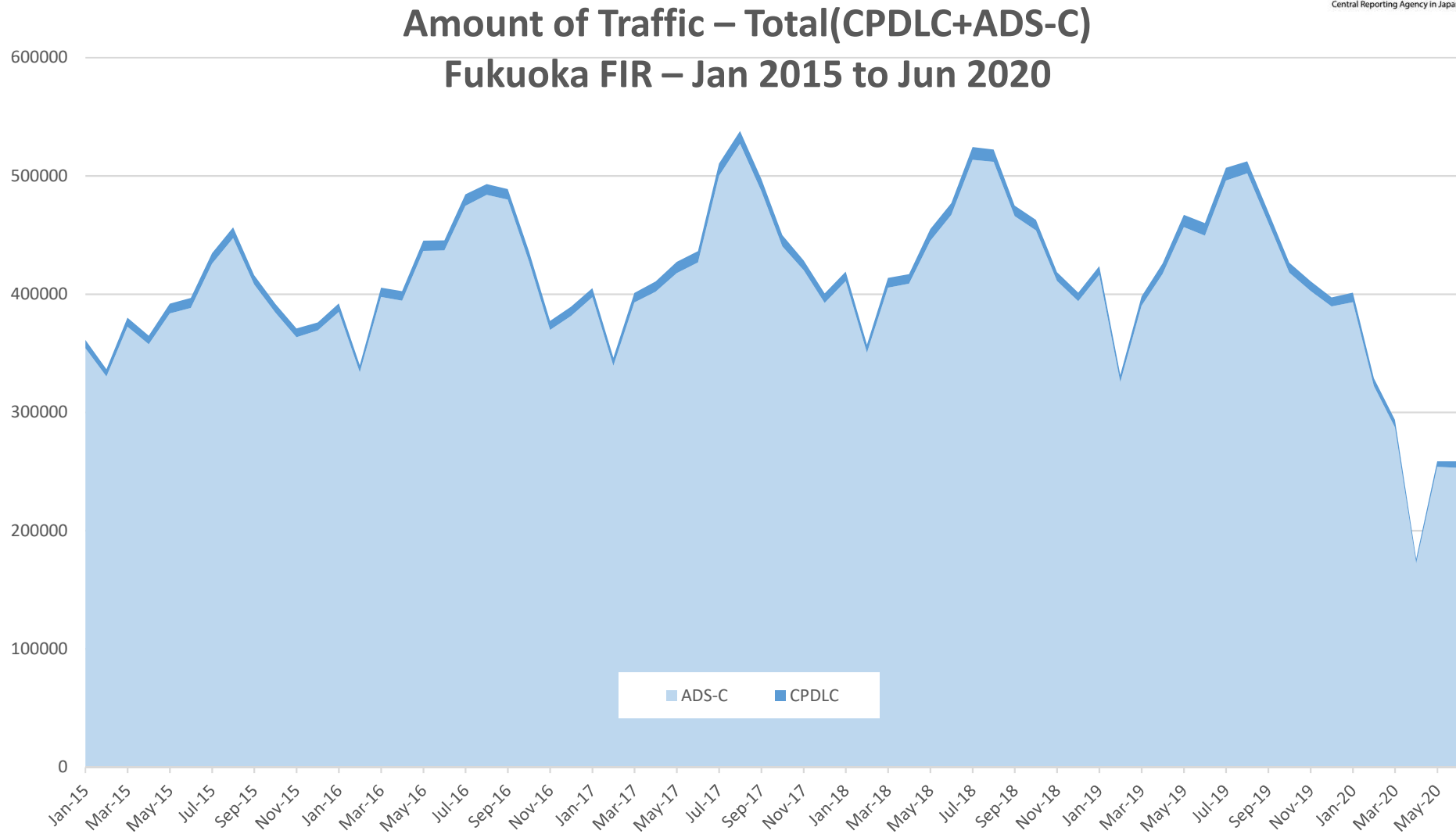
- 1) Reported the results of PBCS performance evaluation every 6 months (January to June 2020) at Fukuoka FIR.**
- 2) The contents of the report are as follows.**
 - Availability
 - Continuity analysis result for each parameter

Datalink Usage in RJJJ

Amount of Traffic - CPDLC/ADS-C Fukuoka FIR - Jan 2015 to Jun 2020



Datalink Usage in RJJJ



Availability

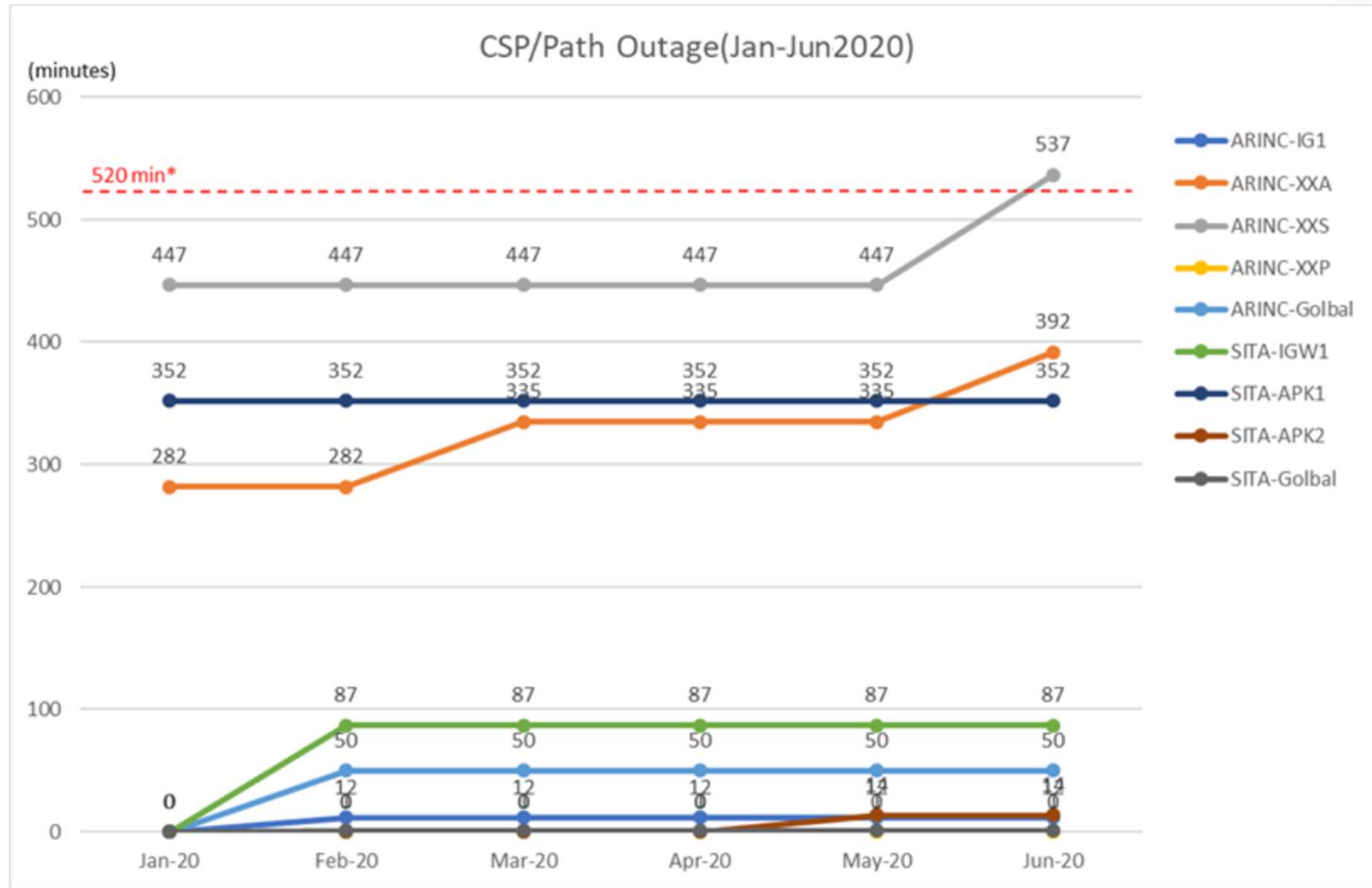
Availability (January – June 2020)

| DSP | Location | Availability(%) | Number of Unplanned Outage | Number of Unplanned Outages > 10min | Accumulated Unplanned Outage Time (min) |
|------------------------|----------|-----------------|-------------------------------|---|---|
| SITA | Global | 99.99 | 1 | 0 | 1 |
| | MTS1 | 100.00 | 0 | 0 | 0 |
| | APK1 | 99.86 | 1 | 1 | 352 |
| | APK2 | 99.99 | 1 | 1 | 14 |
| | IGW1 | 99.96 | 2 | 2 | 87 |
| ARINC | Global | 99.98 | 1 | 1 | 50 |
| | XXP | 100.00 | 0 | 0 | 0 |
| | XXA | 99.85 | 3 | 3 | 392 |
| | IG1 | 99.99 | 2 | 2 | 12 |
| | XXS | 99.79 | 2 | 2 | 537 |
| AVICOM | Global | 100.00 | 0 | 0 | 0 |
| RCP240/RSP180 Criteria | | | | | |
| Safety | | 99.90% | --- | 48 | 520 |
| Efficiency | | 99.99% | --- | 4 | 52 |

Unplanned Outages

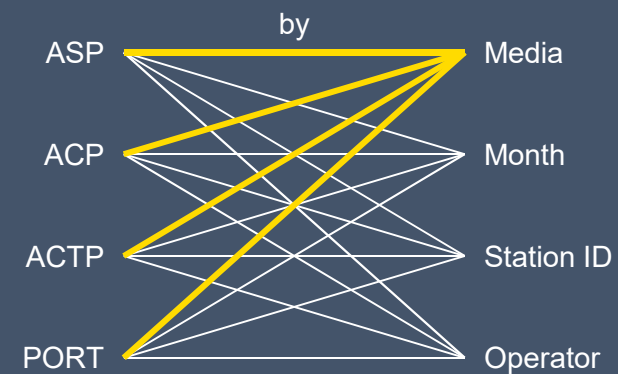
| Start Date | Start Time | Duration (min) | DSP | Service Involved | Location Involved | Reason | Comment (Operational Impact) |
|------------|------------|----------------|-------|------------------|-------------------|--|--|
| 2020/01/21 | 01:00 | 447 | ARINC | I4 | XXS | Inmarsat is experiencing a network service degradation | No impact on flight |
| 2020/01/22 | 00:36 | 352 | SITA | I4 | APK1 | Unexpected Service Degradation - SATELLITE AIRCOM - Inmarsat Data Services | No impact on flight. Aircraft HF voice 84aircrafts |
| 2020/01/22 | 02:00 | 282 | ARINC | I4 | XXA | Unexpected Service Degradation - SATELLITE AIRCOM - Inmarsat Data Services | |
| 2020/02/06 | 23:05 | 50 | SITA | Iridium | IGW1 | Iridium experienced degraded service on Short Burst Data (SBD) | No impact on flight HFvoice 84 aircrafts |
| 2020/02/06 | 23:43 | 12 | ARINC | Iridium | IG1 | Iridium experienced degraded service on Short Burst Data (SBD) | |
| 2020/02/11 | 18:06 | 37 | SITA | Iridium | IGW1 | SATELLITE AIRCOM - Iridium Datalink ACARS Service | No impact on flight |
| 2020/02/20 | 14:40 | 50 | ARINC | ARINC | Global | server reset | No impact on flight |
| 2020/02/28 | 21:45 | 1 | SITA | SITA | Global | SITA/AOC line trouble at 21:45-21:46. | No impact on flight |
| 2020/03/18 | 15:52 | 53 | ARINC | I4 | XXA | an antenna problem at Paumalu GES | No impact on flight HF voice 10 aircrafts |
| 2020/05/11 | 17:24 | 14 | SITA | I3 | APK2 | an antenna problem at Perth GES | No impact on flight |
| 2020/06/10 | 15:08 | 57 | ARINC | I4 | XXA | an antenna problem at Paumalu GES | No impact on flight HF voice 6 aircrafts |
| 2020/06/29 | 18:06 | 90 | ARINC | I4 | XXS | INMARSAT is investigating the fault. | No impact on flight |

Accumulated Unplanned Outage



* Safety target for RCP240/RSP180

Observed Performance by Media Type



Observed Performance by Media Type

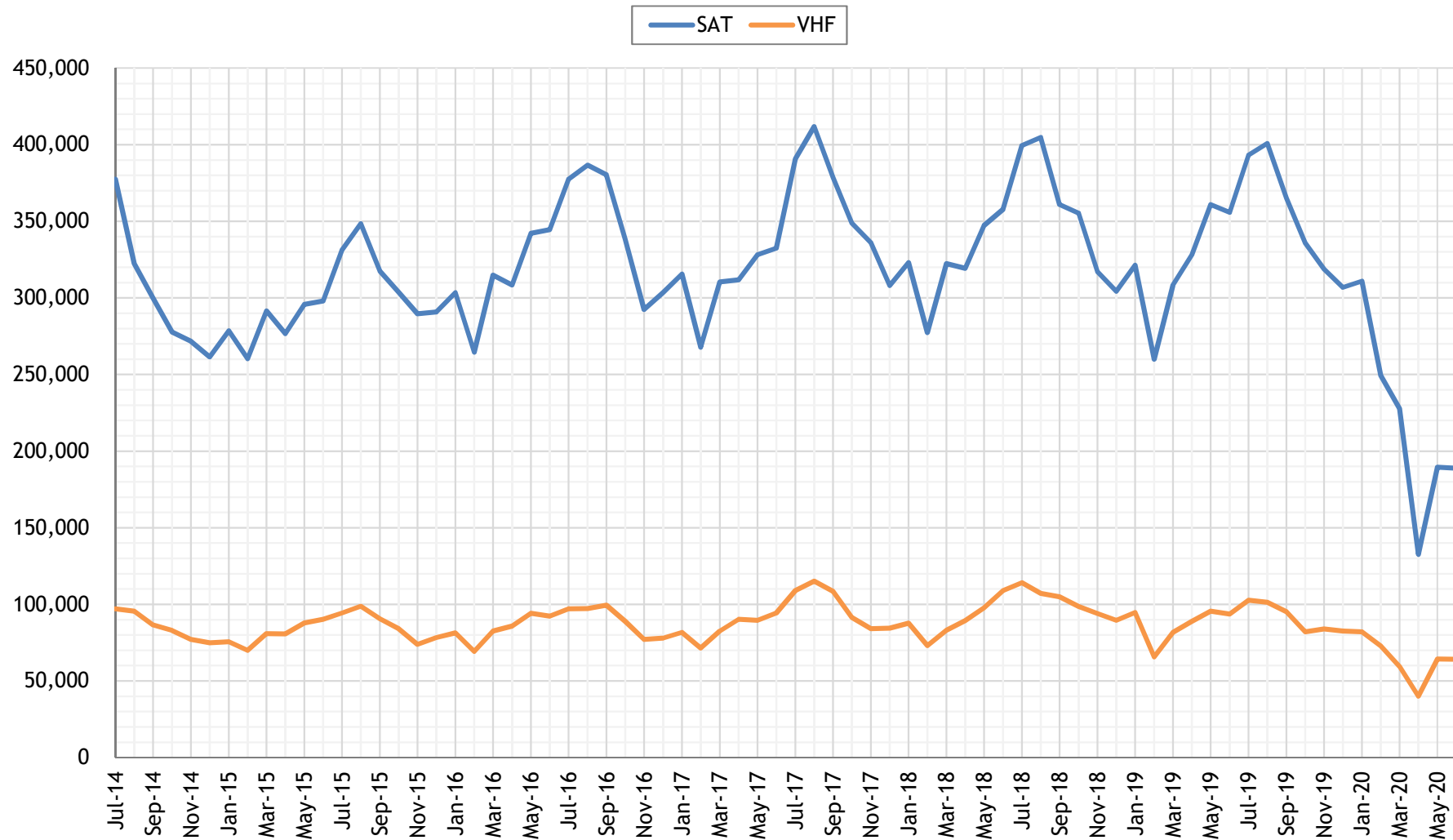
| Media Type | RSP180 | | | RCP240 | | | | | |
|------------------|------------------|---------------|---------------|----------------|---------------|---------------|---------------|---------------|---------------|
| | Count of ADS-C | ASP | | Count of CPDLC | ACTP | | ACP | | PORT |
| | | 95% | 99.9% | | 95% | 99.9% | 95% | 99.9% | 95% |
| Aggregate | 1,682,198 | 98.61% | 99.64% | 34,547 | 99.65% | 99.75% | 99.57% | 99.78% | 99.26% |
| SAT | 1,299,118 | 98.47% | 99.61% | 31,300 | 99.67% | 99.75% | 99.59% | 99.79% | 99.29% |
| VHF | 383,080 | 99.09% | 99.73% | 3,036 | 99.77% | 99.90% | 99.74% | 99.87% | 99.28% |
| SAT/VHF | --- | --- | --- | 118 | 96.61% | 97.46% | 94.92% | 96.61% | 94.62% |
| VHF/SAT | --- | --- | --- | 93 | 91.40% | 96.77% | 94.62% | 96.77% | 99.28% |

Legend:

| | |
|--|--------------------------------|
| | Meets criteria |
| | Under criteria but above 99.0% |
| | Under criteria |

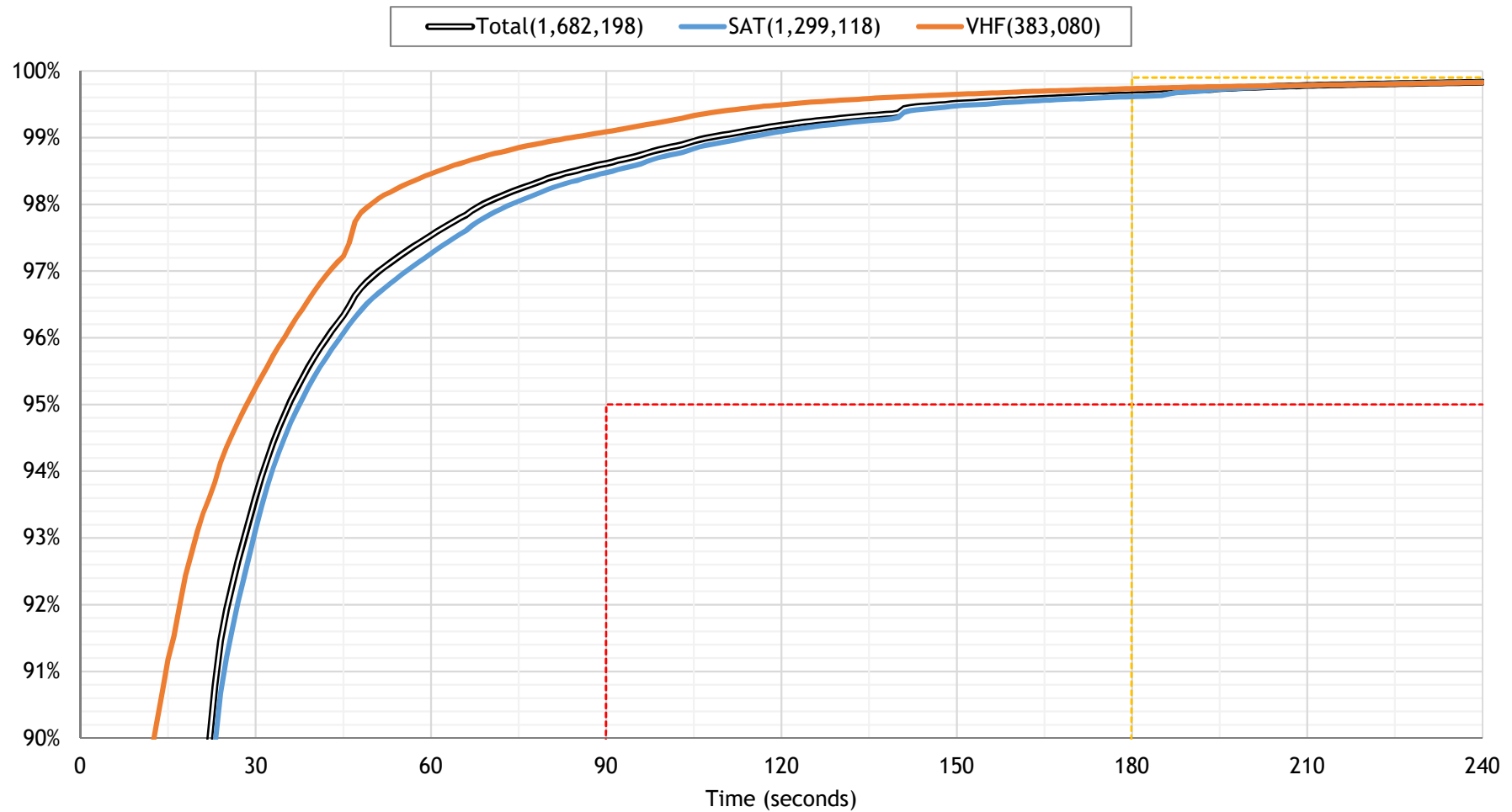
ADS-C Usage by Media Type

Fukuoka FIR - Count of ADS-C Reports - Jul 2014 to Jun 2020



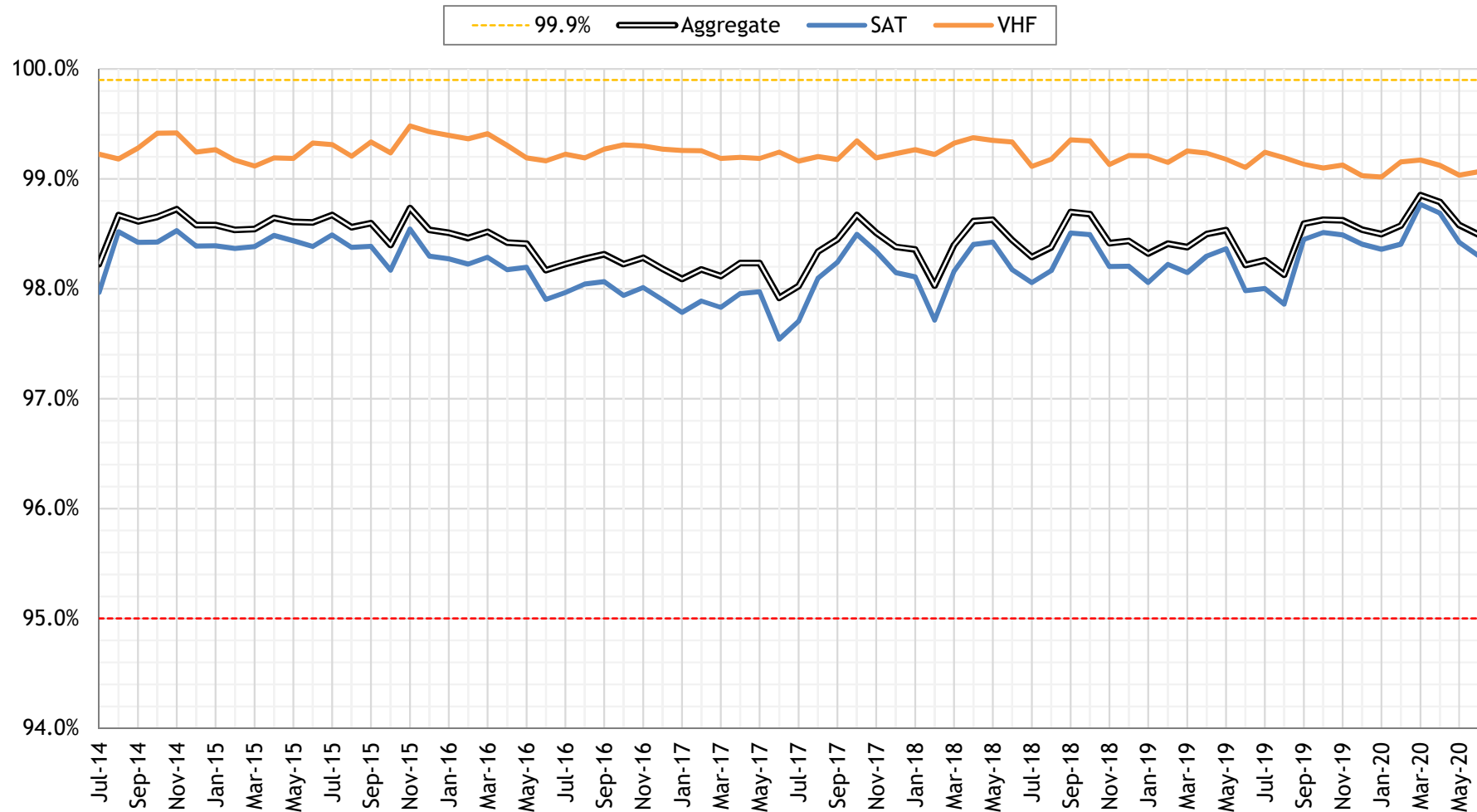
ASP by Media Type

Fukuoka FIR - By Media Type - January to June 2020 ADS-C Actual Surveillance Performance (ASP)



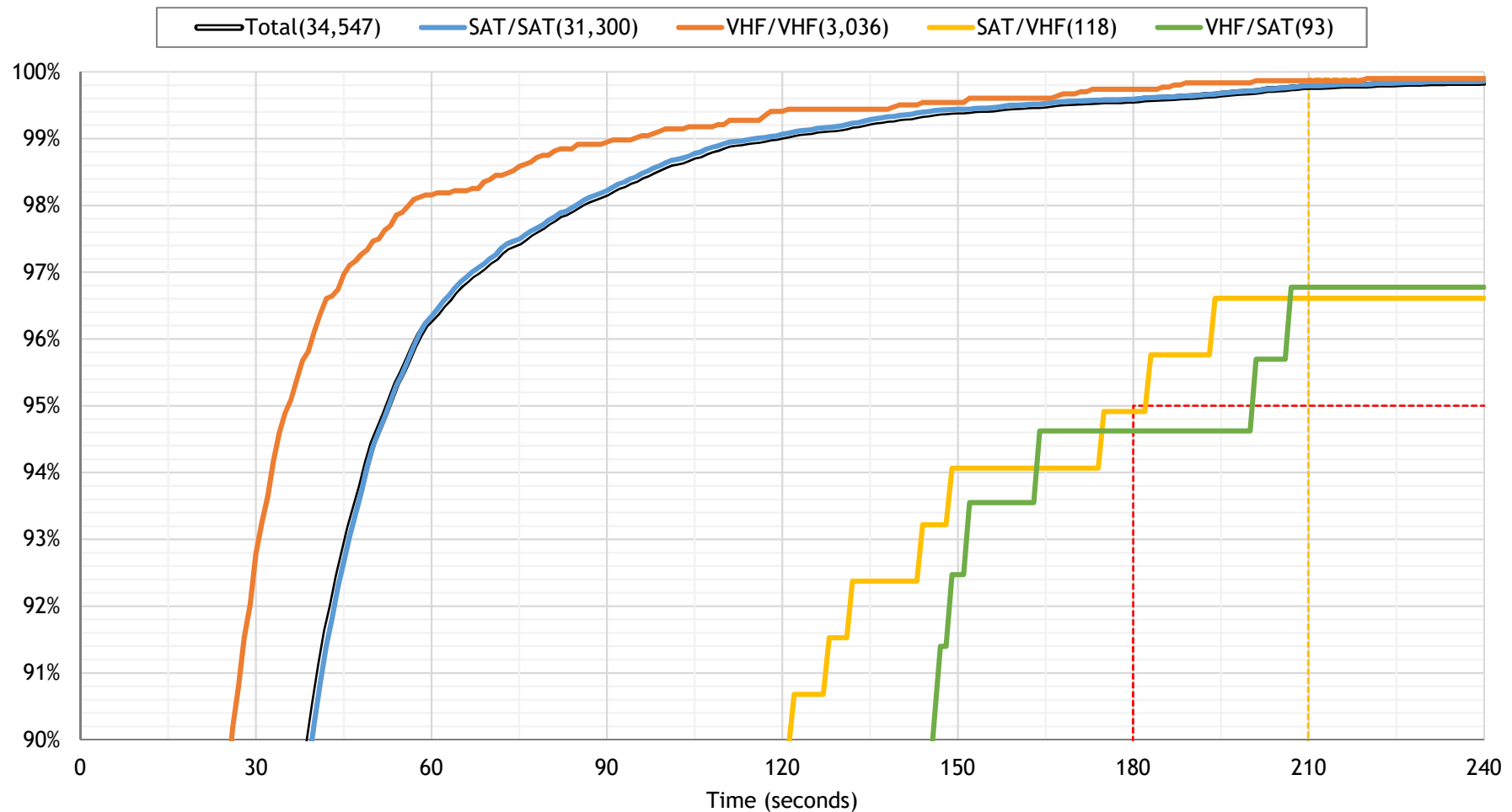
ASP 95% (90s) values for each month

Fukuoka FIR - By Media Type - Jul 2014 to Jun 2020 ADS-C Actual Surveillance Performance 95% (90s)



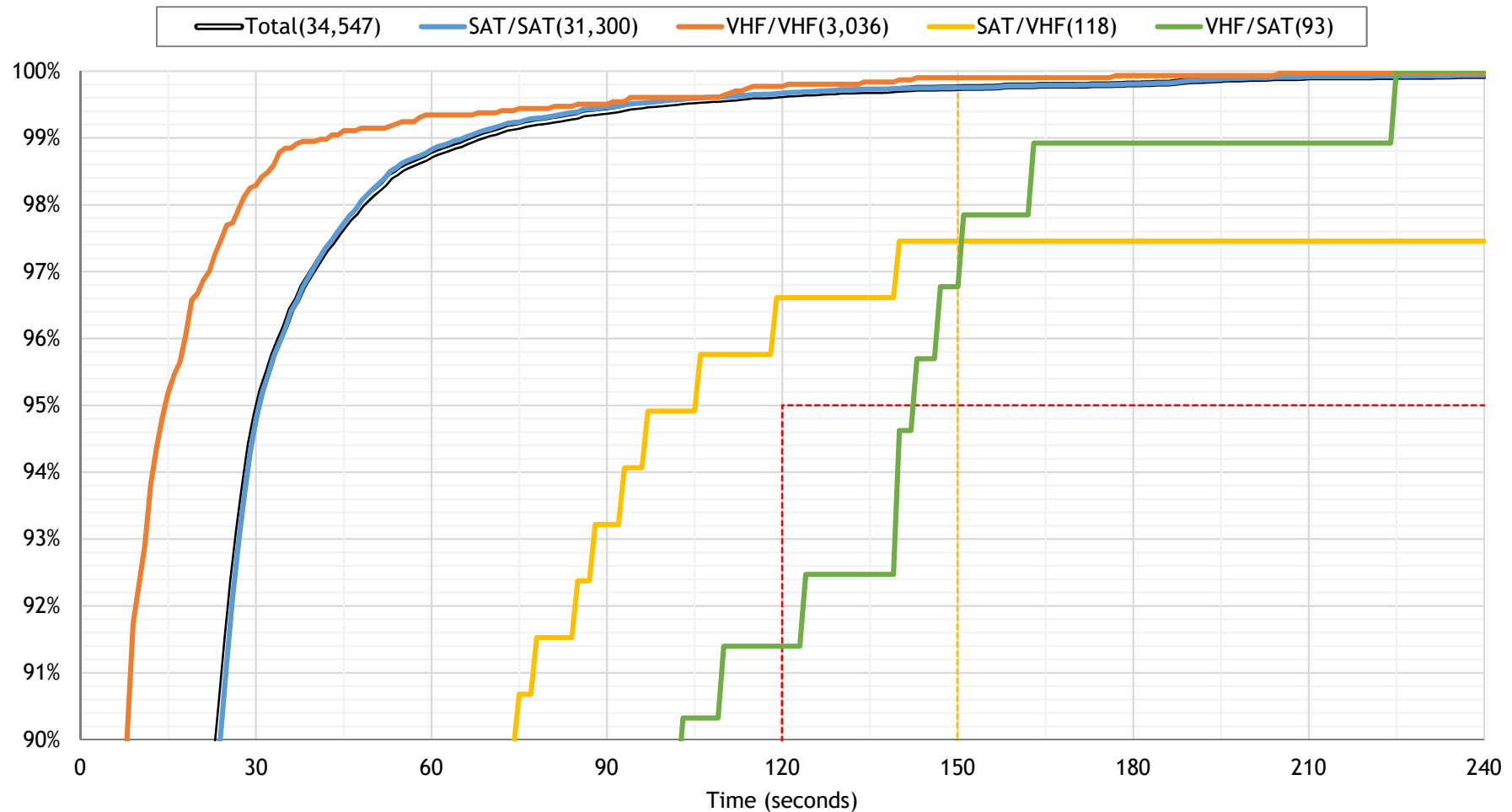
ACP by Media Type

Fukuoka FIR - By Media Type - January to June 2020 CPDLC Actual Communication Performance (ACP)



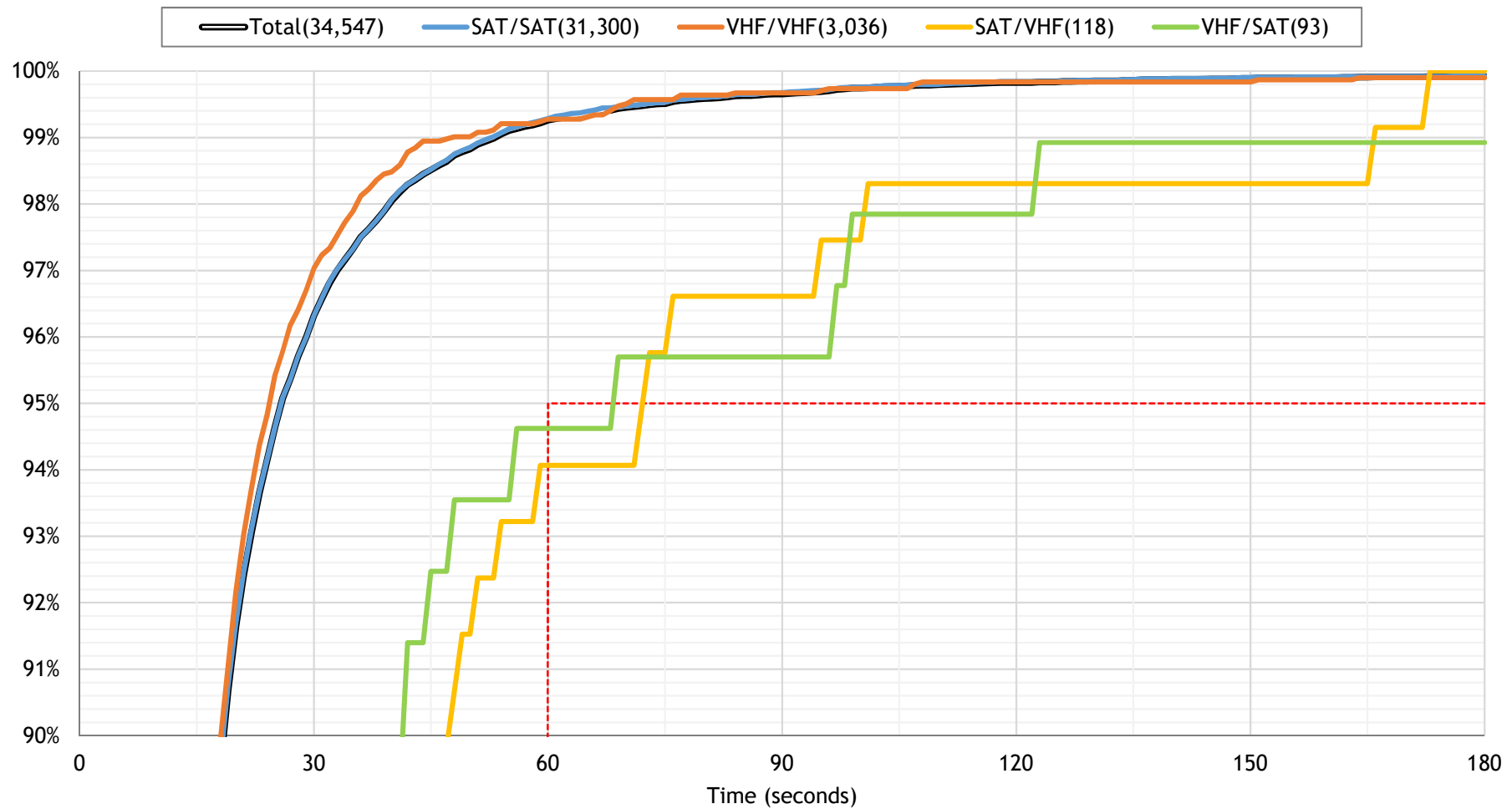
ACTP by Media Type

Fukuoka FIR - By Media Type - January to June 2020 CPDLC Actual Communication Technical Performance (ACTP)

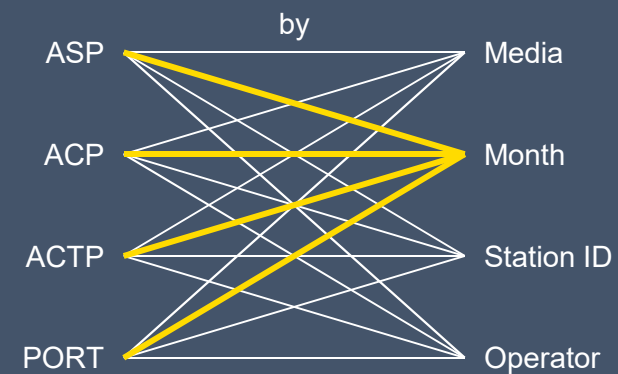


PORT by Media Type

Fukuoka FIR - By Media Type - January to June 2020 CPDLC Pilot Operational Response Time (PORT)



Observed Performance by Month



Observed Performance by Month

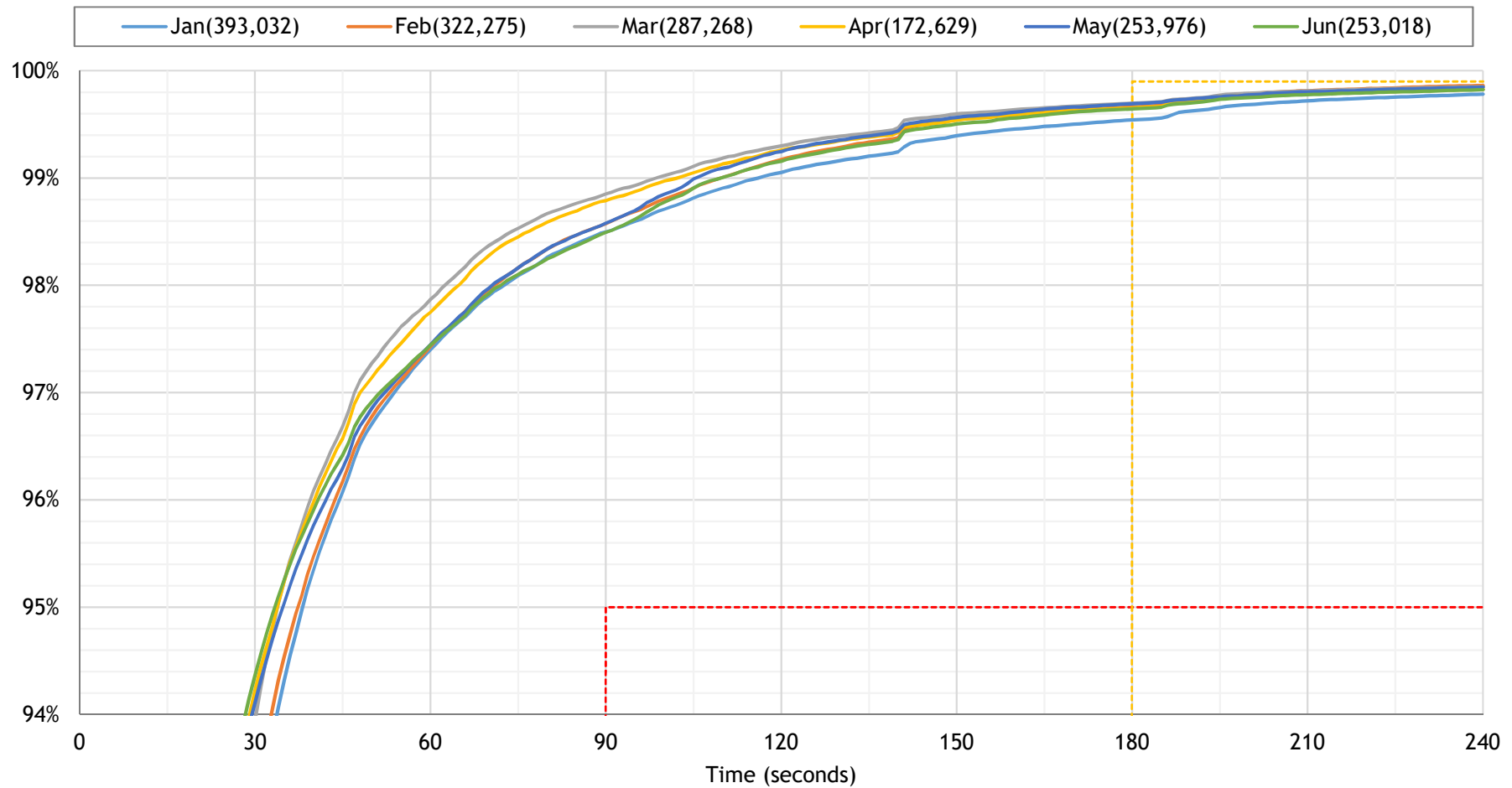
| Month | RSP180 | | | RCP240 | | | | | |
|-------|----------------|--------|--------|----------------|--------|--------|--------|--------|--------|
| | Count of ADS-C | ASP | | Count of CPDLC | ACTP | | ACP | | PORT |
| | | 95% | 99.9% | | 95% | 99.9% | 95% | 99.9% | |
| Jan | 393,032 | 98.50% | 99.54% | 8,091 | 99.60% | 99.72% | 99.51% | 99.78% | 99.18% |
| Feb | 322,275 | 98.58% | 99.66% | 6,535 | 99.65% | 99.74% | 99.59% | 99.80% | 99.36% |
| Mar | 287,268 | 98.85% | 99.70% | 6,411 | 99.80% | 99.86% | 99.72% | 99.84% | 99.34% |
| Apr | 172,629 | 98.79% | 99.65% | 3,345 | 99.61% | 99.73% | 99.55% | 99.67% | 99.31% |
| May | 253,976 | 98.58% | 99.69% | 4,685 | 99.57% | 99.74% | 99.55% | 99.79% | 99.10% |
| Jun | 253,018 | 98.49% | 99.65% | 5,480 | 99.62% | 99.71% | 99.51% | 99.74% | 99.25% |

Legend:

| | |
|--|--------------------------------|
| | Meets criteria |
| | Under criteria but above 99.0% |
| | Under criteria |

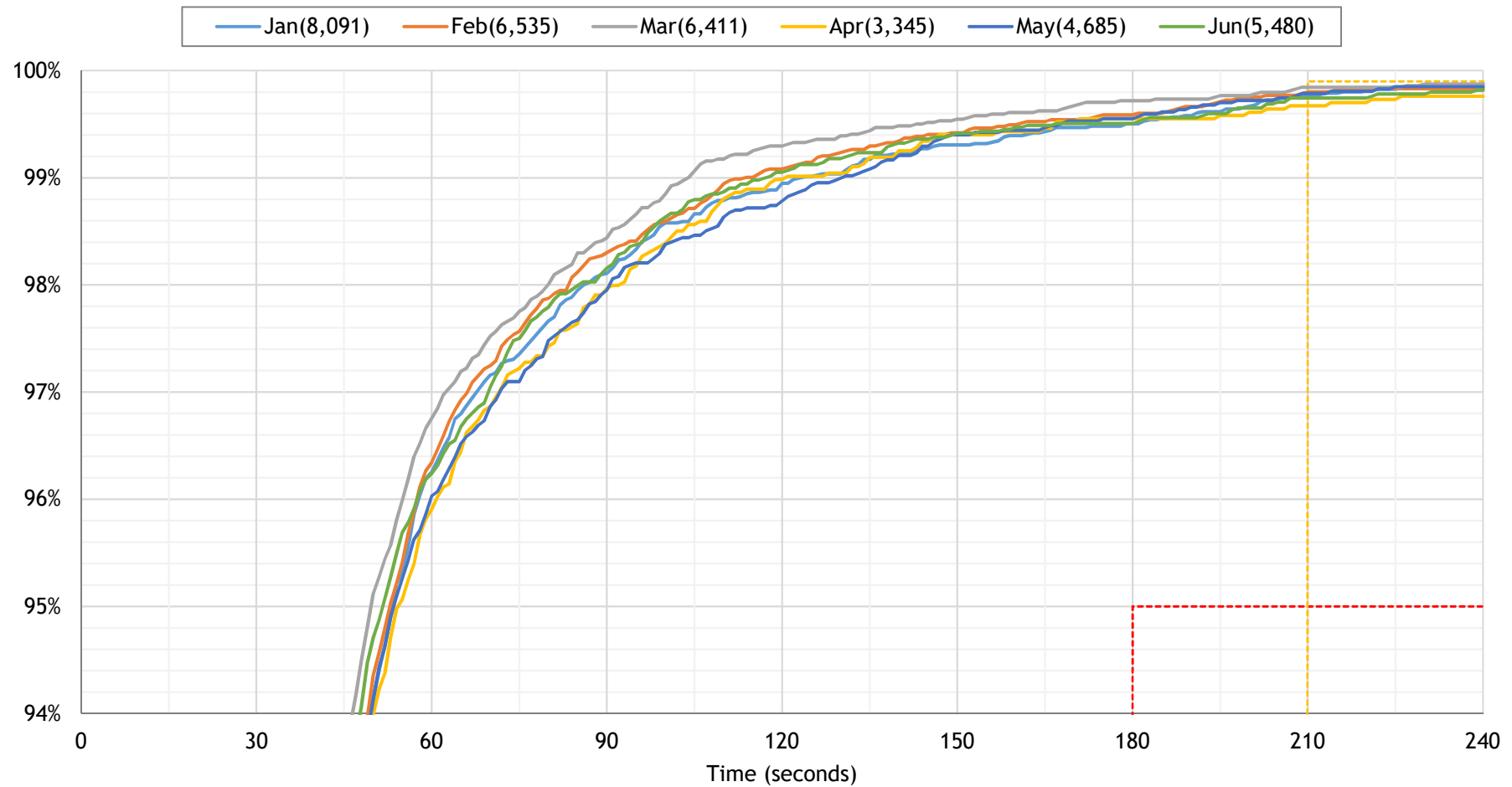
ASP by Month

Fukuoka FIR - By Month - January to June 2020 ADS-C Actual Surveillance Performance (ASP)



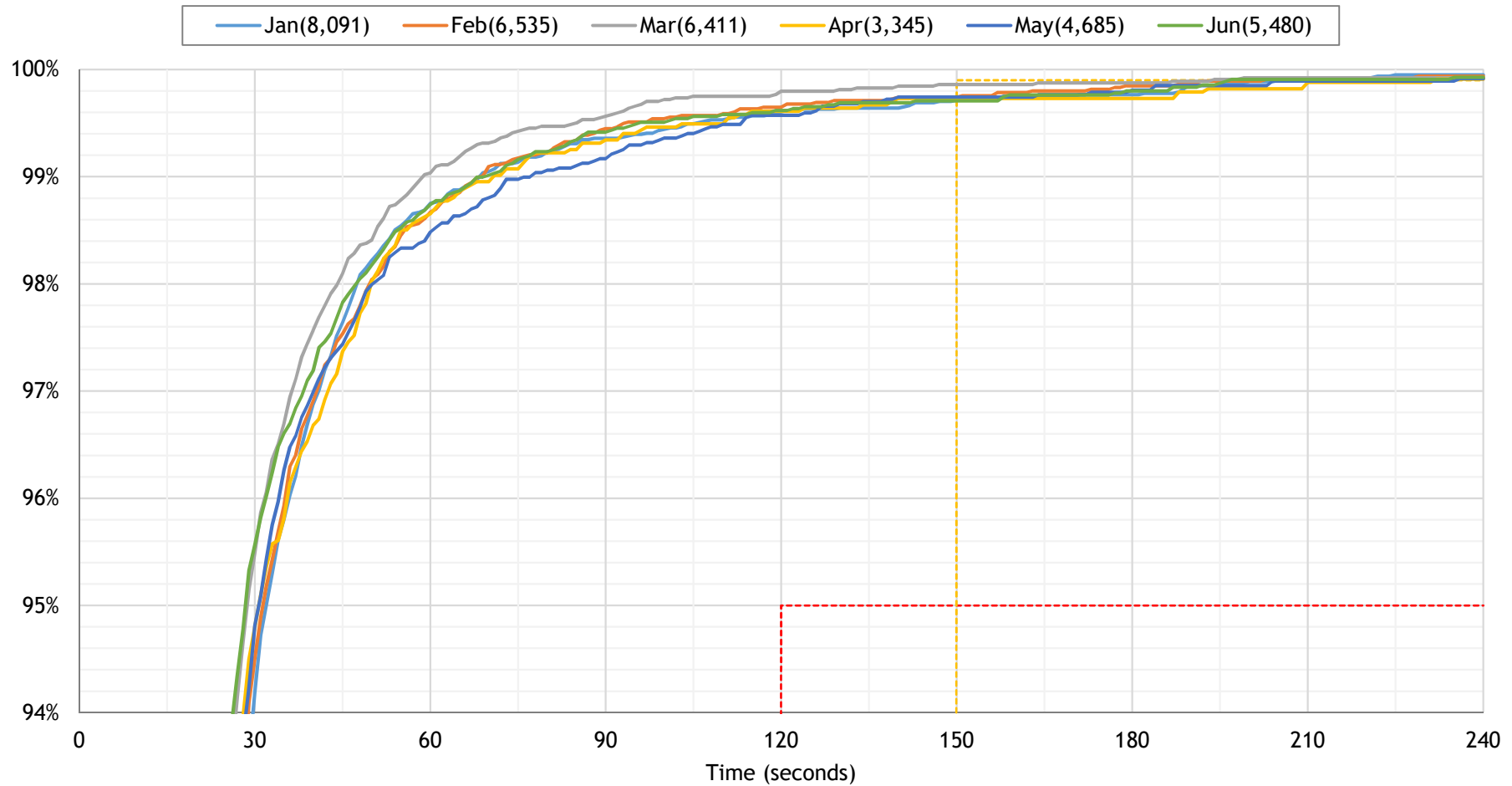
ACP by Month

Fukuoka FIR - By Month - January to June 2020 CPDLC Actual Communication Performance (ACP)



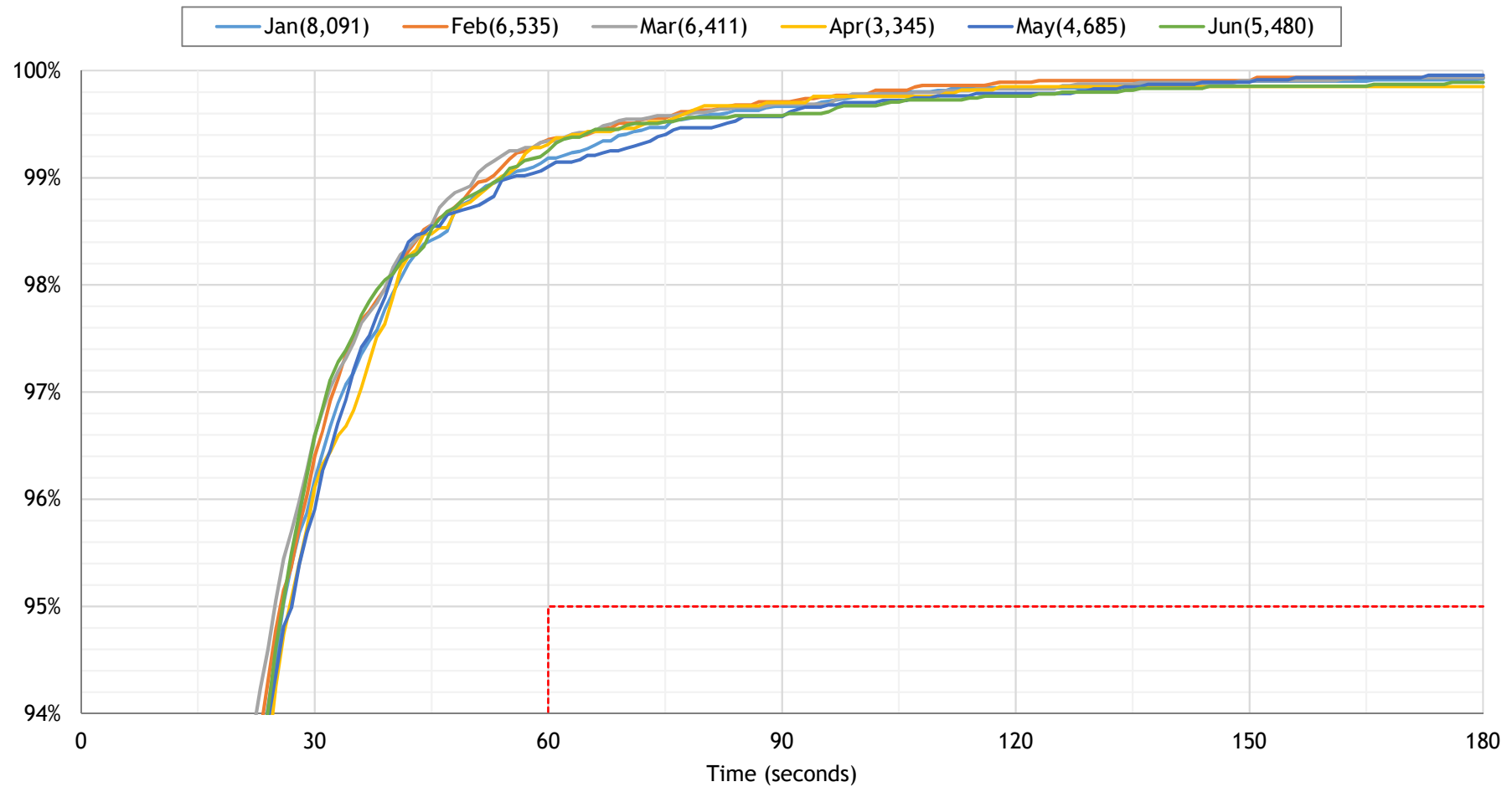
ACTP by Month

Fukuoka FIR - By Month - January to June 2020 CPDLC Actual Communication Technical Performance (ACTP)

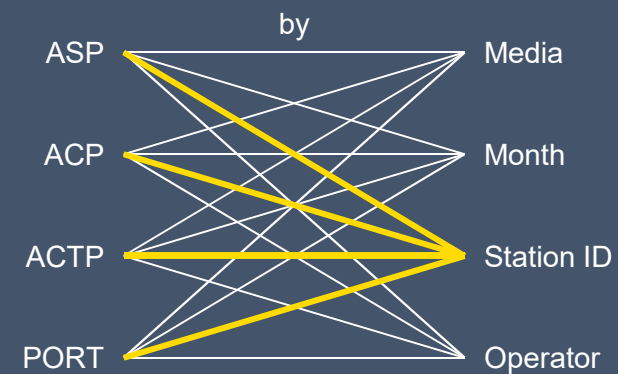


PORT by Month

Fukuoka FIR - By Month - January to June 2020 CPDLC Pilot Operational Response Time (PORT)



Observed Performance by Station ID



Observed Performance by Station ID

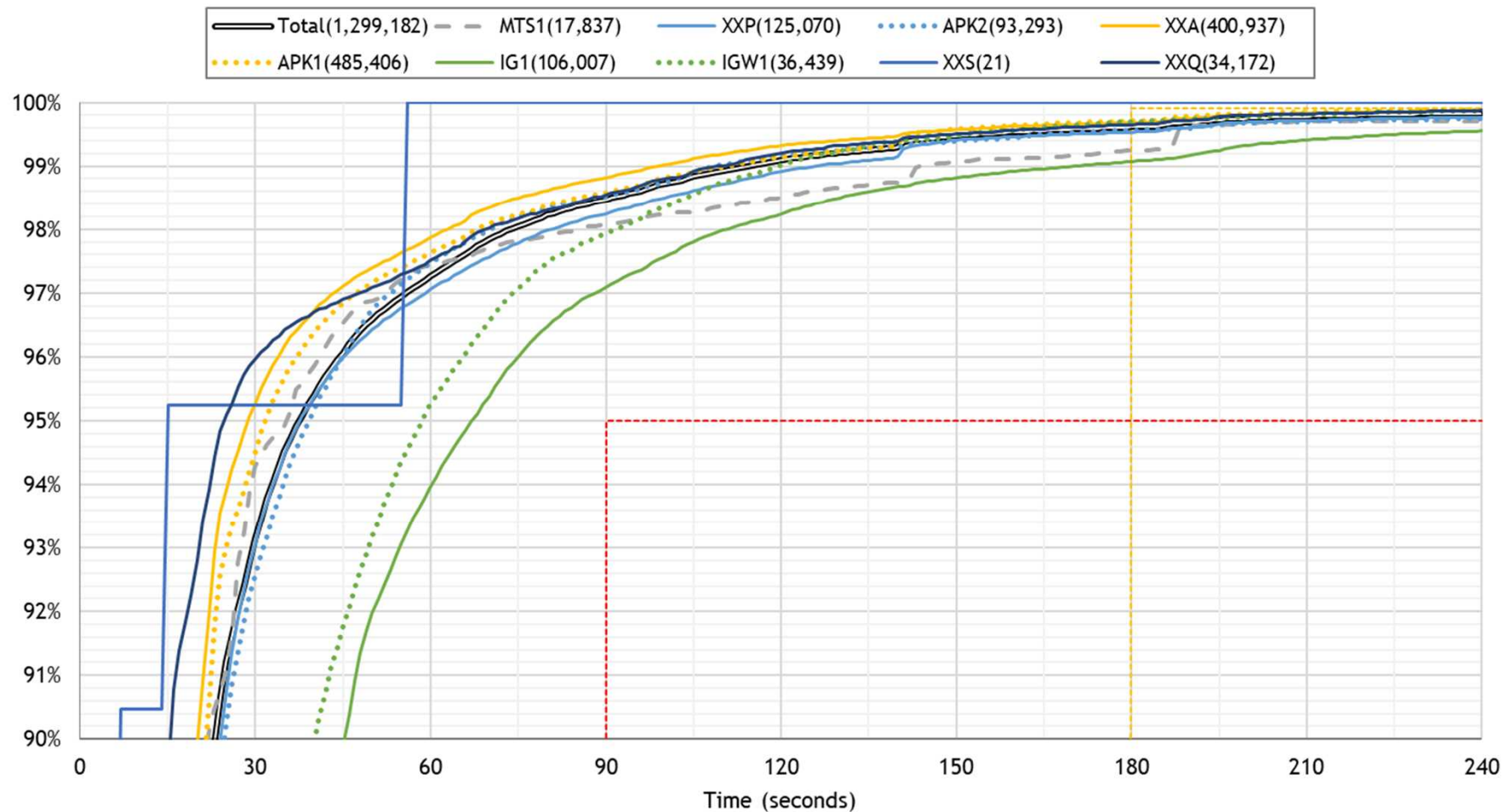
| Station ID | RSP180 | | | RCP240 | | | | | |
|------------|----------------|---------|---------|----------------|--------|---------|--------|--------|--------|
| | Count of ADS-C | ASP | | Count of CPDLC | ACTP | | ACP | | PORT |
| | | 95% | 99.90% | | 95% | 99.90% | 95% | 99.90% | 95% |
| MTS1 | 17,837 | 98.07% | 99.25% | 326 | 99.39% | 99.39% | 99.08% | 99.39% | 99.08% |
| XXP | 125,070 | 98.25% | 99.54% | 3,065 | 99.67% | 99.71% | 99.45% | 99.71% | 98.76% |
| APK2 | 93,293 | 98.53% | 99.57% | 2,499 | 99.60% | 99.64% | 99.40% | 99.80% | 99.20% |
| XXA | 400,937 | 98.82% | 99.68% | 9,257 | 99.77% | 99.89% | 99.82% | 99.89% | 99.52% |
| APK1 | 485,406 | 98.59% | 99.71% | 12,024 | 99.70% | 99.77% | 99.63% | 99.83% | 99.48% |
| IG1 | 106,007 | 97.09% | 99.07% | 2,500 | 99.00% | 99.20% | 98.68% | 99.24% | 98.04% |
| IGW1 | 36,439 | 97.94% | 99.69% | 799 | 99.87% | 100.00% | 99.75% | 99.75% | 99.00% |
| XXS | 21 | 100.00% | 100.00% | 0 | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| XXQ | 34,172 | 98.55% | 99.65% | 951 | 99.79% | 99.79% | 99.58% | 99.89% | 99.47% |

Legend:

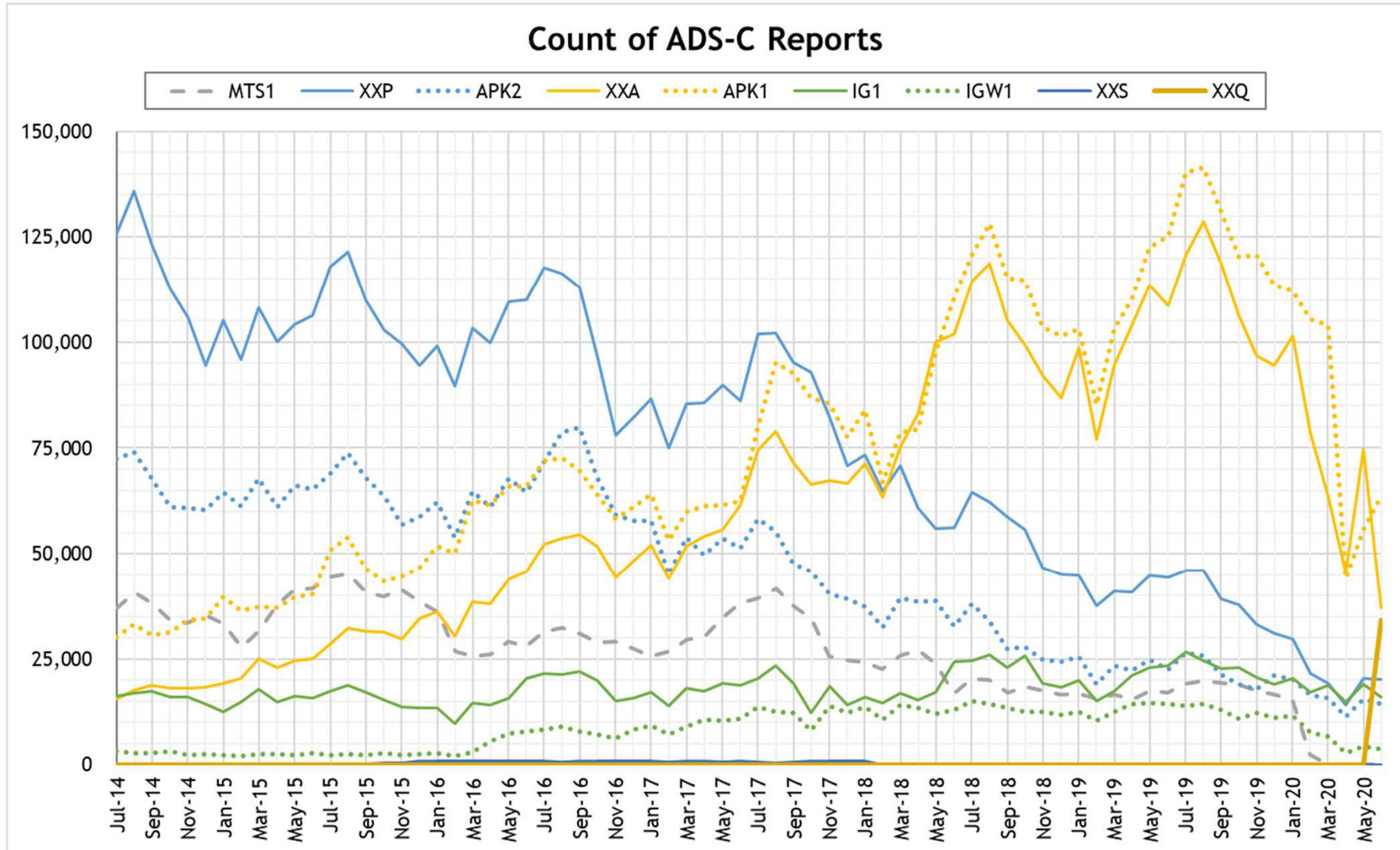
| | |
|--|--------------------------------|
| | Meets criteria |
| | Under criteria but above 99.0% |
| | Under criteria |

ASP by Station ID

Fukuoka FIR - By Station Identifier - January to June 2020 ADS-C Actual Surveillance Performance (ASP)

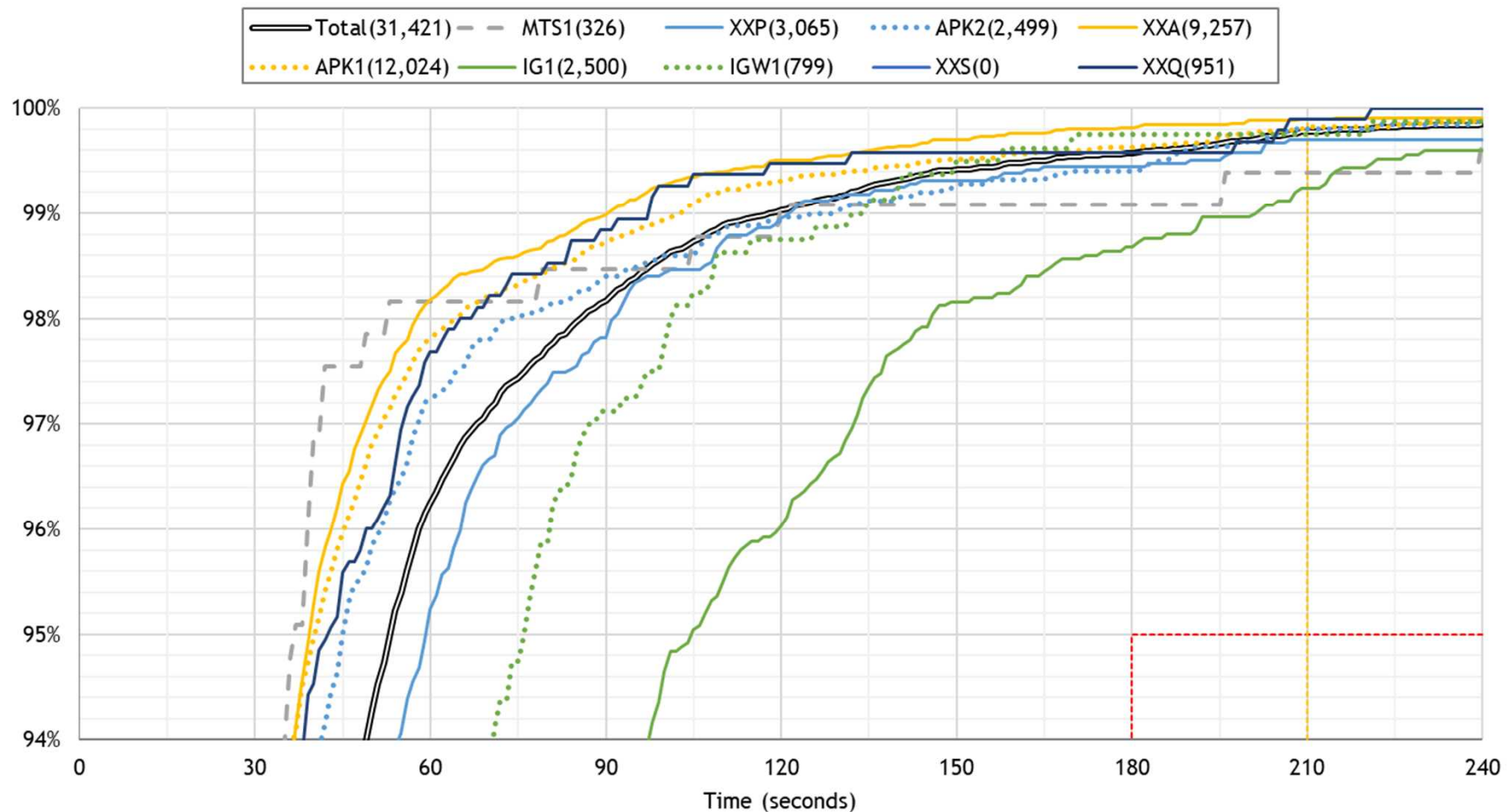


ADS-C Usage by Station ID



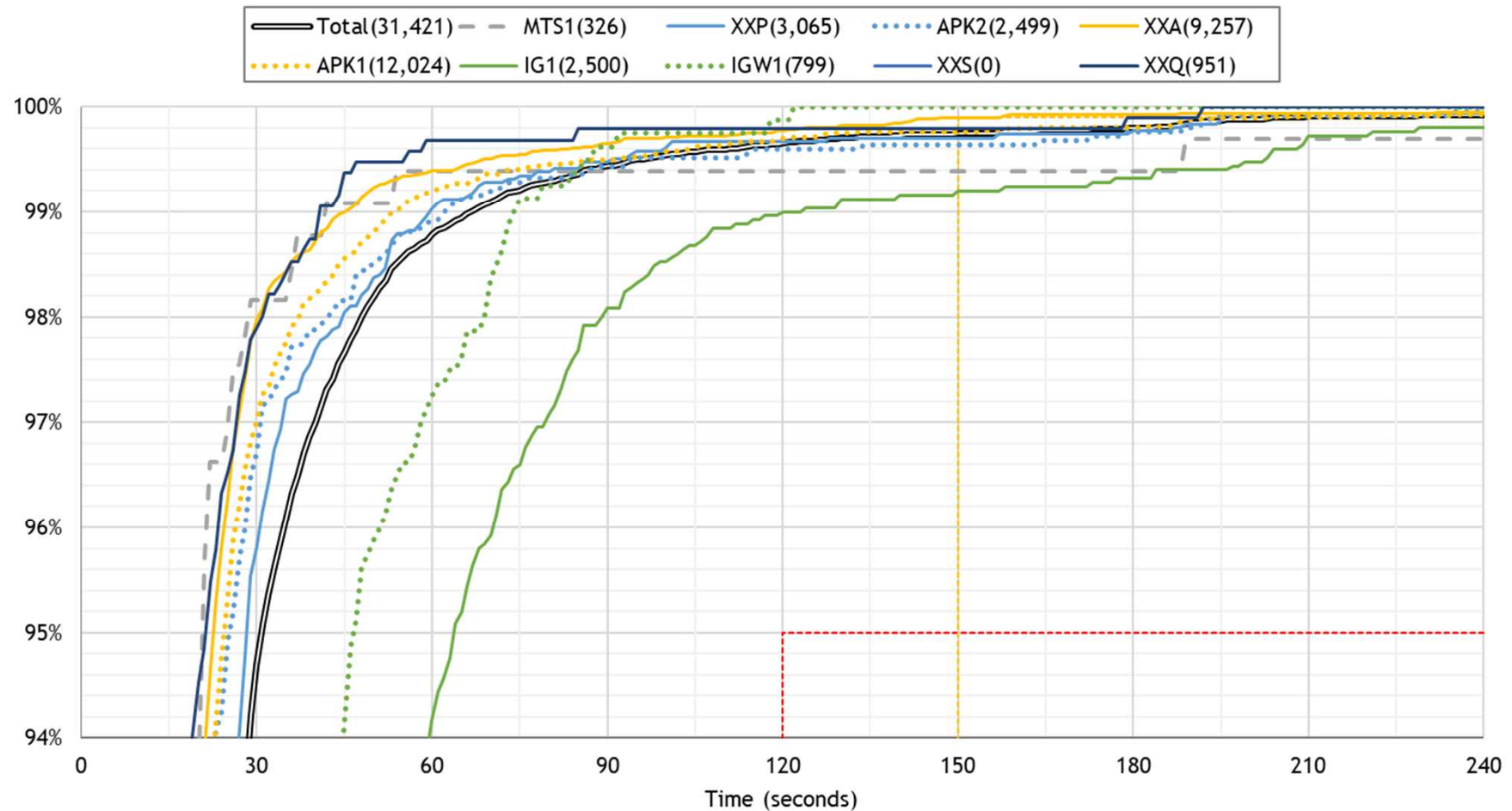
ACP by Station ID

Fukuoka FIR - By Station Identifier - January to June 2020 CPDLC Actual Communication Performance (ACP)



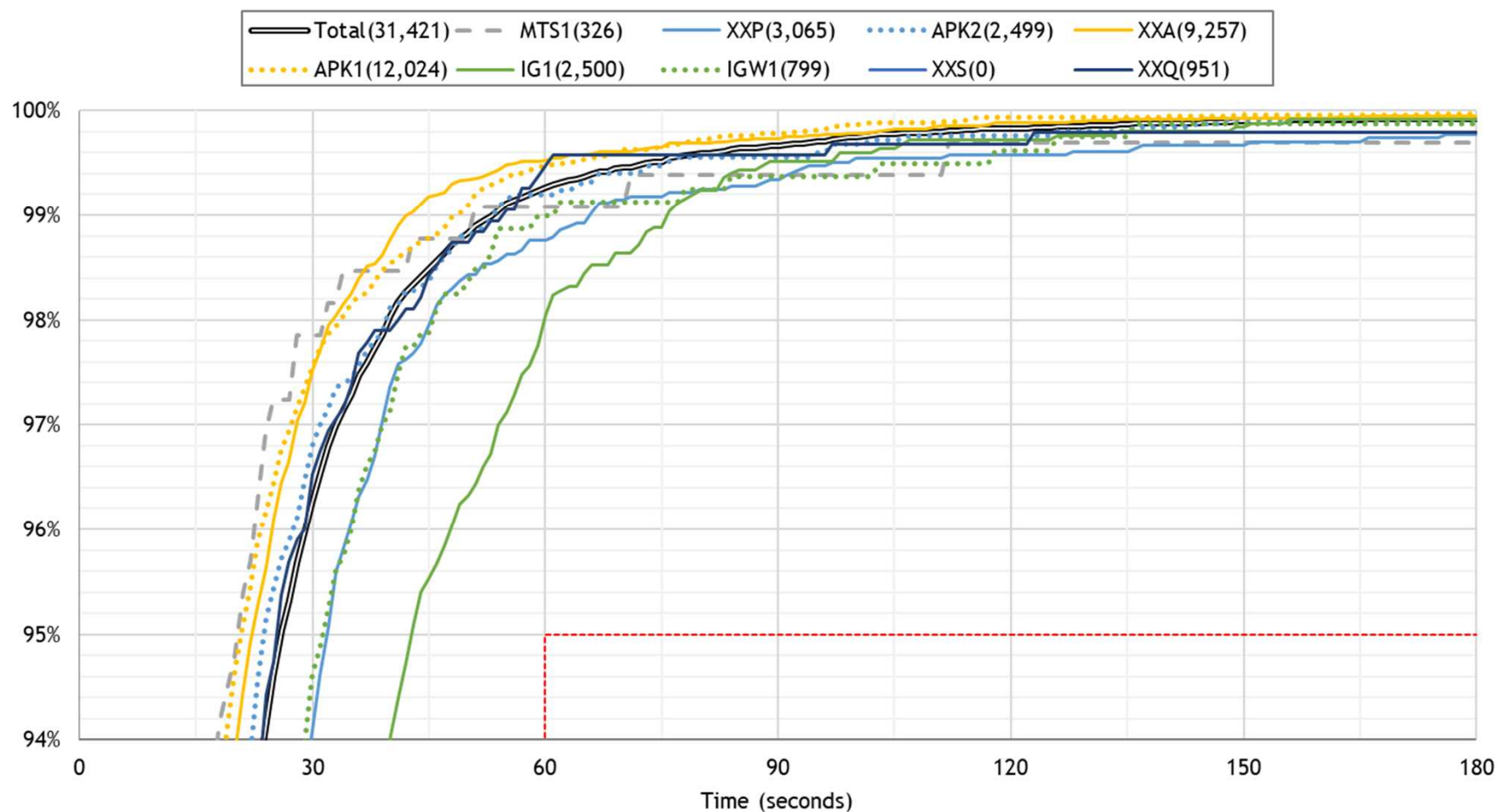
ACTP by Station ID

Fukuoka FIR - By Station Identifier - January to June 2020 CPDLC Actual Communication Technical Performance (ACTP)



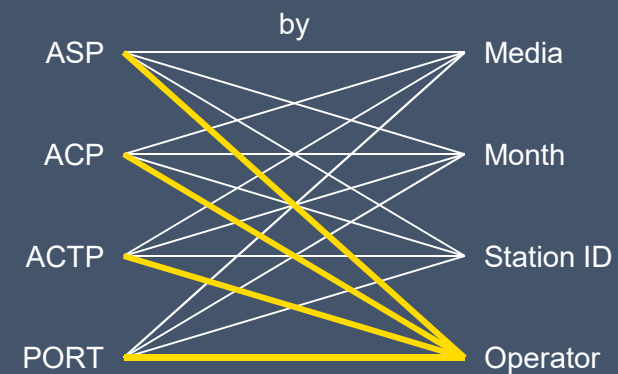
PORT by Station ID

Fukuoka FIR - By Station Identifier - January to June 2020 CPDLC Pilot Operational Response Time (PORT)



Observed Performance by Operator

Table only, Percentile graph not contained



Summary of Performance by Operator

- ◆ 65 operators with at least 100 ADS-C messages
 - 1 operator were below 95.0% at ACP95% criteria.
 - 3 operators were below 99.0% at ASP99.9% criteria.
- ◆ 34 operators with at least 100 RCP transactions
 - All operator meets ACP95% criteria.
 - All operators were above 99.0% at ACP99.9% criteria.

| | RSP180 | | RCP240 | | | | |
|-----------------------------------|--------|-------|--------|-------|-----|-------|------|
| | ASP | | ACTP | | ACP | | PORT |
| | 95% | 99.9% | 95% | 99.9% | 95% | 99.9% | 95% |
| Meets Criteria | 64 | 13 | 34 | 16 | 34 | 16 | 34 |
| Under criteria but above 99.0% | --- | 49 | --- | 18 | --- | 18 | --- |
| Under criteria | 1 | 3 | 0 | 0 | 0 | 0 | 0 |

Operator Not Meeting RSP180/RCP240

| OP Code | RSP180 | | | | RCP240 | | | | | | |
|---------|----------------|------------------|--------|---------|----------------|------------------|---------|---------|---------|---------|---------|
| | Count of ADS-C | % of Total ADS-C | ASP | | Count of CPDLC | % of Total CPDLC | ACTP | | ACP | | PORT |
| | | | 95% | 99.9% | | | 95% | 99.9% | 95% | 99.9% | |
| GIA | 7,950 | 0.47% | 96.75% | 98.45% | 134 | 0.39% | 99.25% | 99.25% | 98.51% | 99.25% | 98.51% |
| RKS | 1,398 | 0.08% | 96.92% | 98.57% | 25 | 0.07% | 96.00% | 96.00% | 96.00% | 96.00% | 100.00% |
| TGW | 216 | 0.01% | 94.44% | 100.00% | 3 | 0.01% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |
| EDG | 186 | 0.01% | 97.31% | 98.39% | 3 | 0.01% | 100.00% | 100.00% | 100.00% | 100.00% | 33.33% |

*No-colored where under 100 data points.

Legend:

| | |
|--|--------------------------------|
| | Meets criteria |
| | Under criteria but above 99.0% |
| | Under criteria |

Summary of Performance by Operator/AC-Type

- ◆ 177 operator/AC-type pairs with at least 100 ADS-C messages
 - 3 pairs not meet ASP95% criteria.
 - 12 pairs were below 99.0% at ASP99.9% criteria.
- ◆ 74 operator/AC-type pairs with at least 100 RCP transactions
 - All operator meets ACP95% criteria.
 - 2 pairs were below 99.0% at ACP99.9% criteria.

| | RSP180 | | RCP240 | | | | |
|--------------------------------|--------|-------|--------|-------|-----|-------|------|
| | ASP | | ACTP | | ACP | | PORT |
| | 95% | 99.9% | 95% | 99.9% | 95% | 99.9% | 95% |
| Meets Criteria | 174 | 50 | 74 | 45 | 74 | 47 | 74 |
| Under criteria but above 99.0% | --- | 115 | --- | 27 | --- | 25 | --- |
| Under criteria | 3 | 12 | 0 | 2 | 0 | 2 | 0 |

Operator/AC-Type Not Meeting RSP180/RCP240

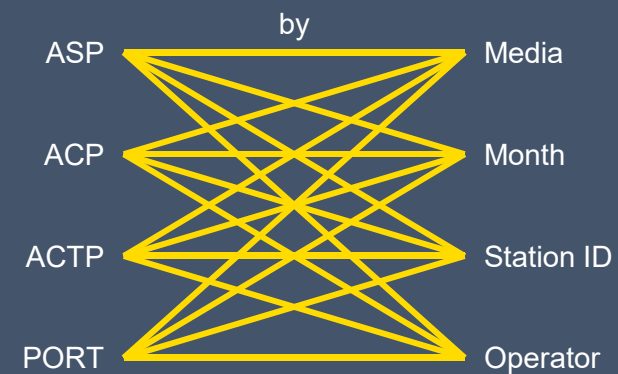
| OP Code | Aircraft Type | RSP180 | | | | RCP240 | | | | | | |
|---------|---------------|----------------|------------------|--------|--------|----------------|------------------|---------|---------|---------|---------|---------|
| | | Count of ADS-C | % of Total ADS-C | ASP | | Count of CPDLC | % of Total CPDLC | ACTP | | ACP | | PORT |
| | | | | 95% | 99.9% | | | 95% | 99.9% | 95% | 99.9% | |
| CPA | B748 | 34,540 | 2.05% | 98.09% | 98.86% | 785 | 2.27% | 98.73% | 99.24% | 99.11% | 99.24% | 99.49% |
| CPA | B77W | 29,731 | 1.77% | 96.67% | 98.71% | 891 | 2.58% | 98.43% | 98.65% | 97.98% | 98.99% | 98.54% |
| UPS | B744 | 13,937 | 0.83% | 98.56% | 99.86% | 185 | 0.54% | 99.46% | 100.00% | 98.92% | 98.92% | 98.38% |
| WGN | MD11 | 7,785 | 0.46% | 97.75% | 98.95% | 96 | 0.28% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |
| SIA | B78X | 6,145 | 0.37% | 94.56% | 99.87% | 111 | 0.32% | 98.20% | 99.10% | 99.10% | 99.10% | 97.30% |
| PAC | B763 | 4,695 | 0.28% | 97.02% | 98.96% | 100 | 0.29% | 100.00% | 100.00% | 100.00% | 100.00% | 97.00% |
| GIA | B77W | 4,484 | 0.27% | 95.45% | 97.73% | 94 | 0.27% | 98.94% | 98.94% | 98.94% | 98.94% | 100.00% |
| PAL | A321 | 2,802 | 0.17% | 85.65% | 91.51% | 41 | 0.12% | 87.80% | 95.12% | 95.12% | 97.56% | 100.00% |
| ANA | B78X | 1,868 | 0.11% | 94.91% | 99.84% | 26 | 0.08% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |
| ACA | B788 | 1,739 | 0.10% | 98.50% | 98.91% | 38 | 0.11% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |
| RKS | GLEX | 793 | 0.05% | 95.84% | 98.36% | 13 | 0.04% | 92.31% | 92.31% | 92.31% | 92.31% | 100.00% |
| CLX | B744 | 689 | 0.04% | 98.11% | 98.40% | 19 | 0.05% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |
| MAS | B738 | 499 | 0.03% | 95.99% | 98.80% | 5 | 0.01% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |
| GIA | A339 | 272 | 0.02% | 97.79% | 98.53% | 4 | 0.01% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |
| EDG | GLF5 | 186 | 0.01% | 97.31% | 98.39% | 3 | 0.01% | 100.00% | 100.00% | 100.00% | 100.00% | 33.33% |

*No-colored where under 100 data points.

Legend:

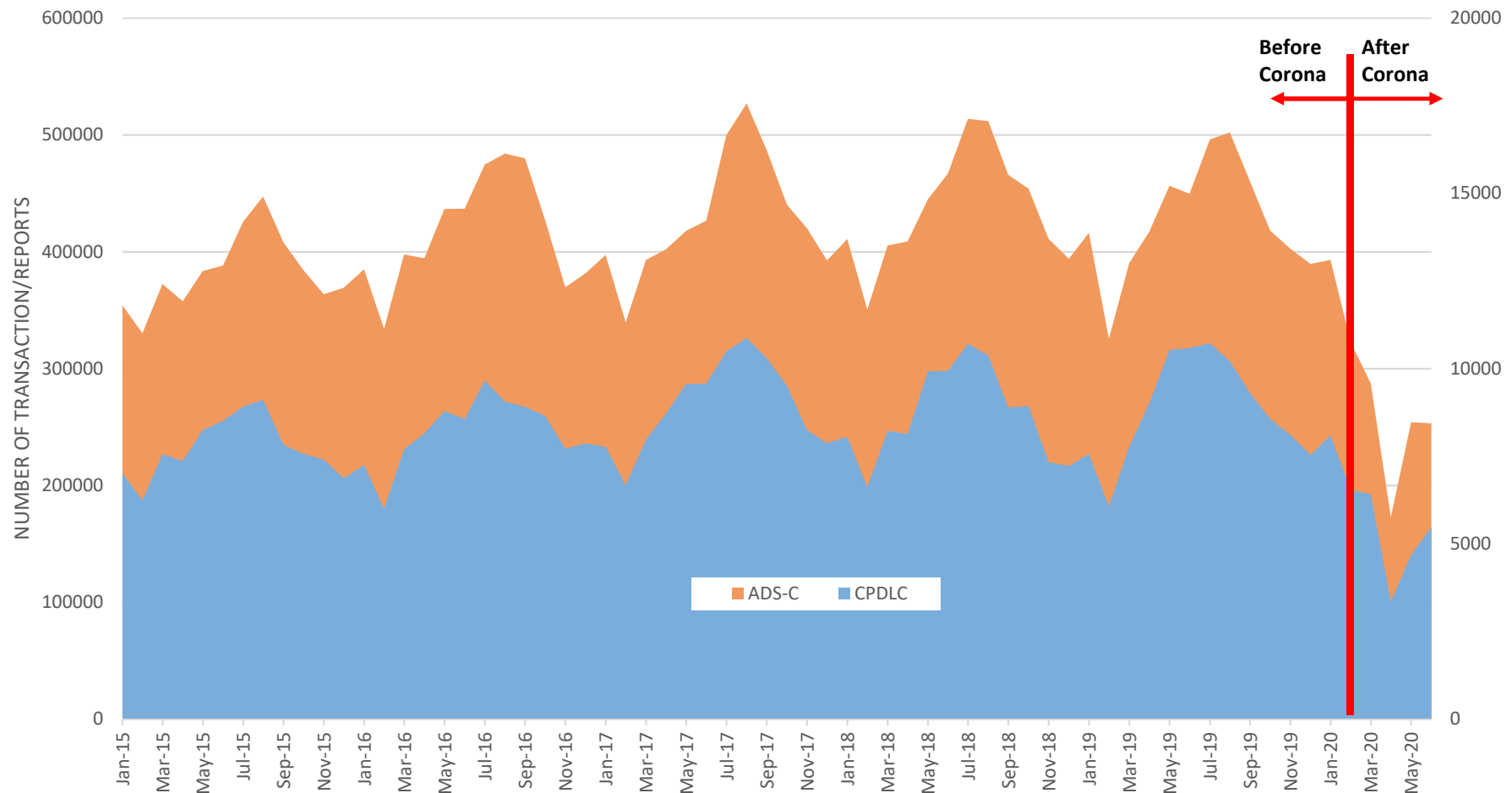
| | |
|--|--------------------------------|
| | Meets criteria |
| | Under criteria but above 99.0% |
| | Under criteria |

Specific issues: **COVID-19** influence report



COVID-19

Amount of Traffic - CPDLC/ADS-C Fukuoka FIR - Jan 2015 to Jun 2020



Every year, the counts of ADS-C and CPDLC tend to reach the lower limit February and the upper limit July. In 2020, due to the influence of COVID-19 (Corona), the number of counts is suppressed to about half of annually.

COVID-19

①Aggregate and compare in semi-annual units (first half of 2019 / second half of 2019 / first half of 2020)

| Term | Count of Aircrafts | Count of ADS-C | Count of CPDLC | Count of ADS-C > 600 | OP CODE |
|---------------------|--------------------|----------------|----------------|----------------------|------------------|
| | | | | Count of aircraft | Count of OP CODE |
| first half of 2020 | 2,769 | 1,688,640 | 34,547 | 918 | 264 |
| second half of 2019 | 3,073 | 2,668,737 | 54,855 | 1,191 | 394 |
| first half of 2019 | 3,082 | 2,454,906 | 51,506 | 1,148 | 368 |

②Comparison by monthly total for the first half of 2020 (January-June 2020)

| Term | Count of Aircrafts | Count of ADS-C | Count of CPDLC | Count of ADS-C > 100 | OP CODE |
|---------------|--------------------|----------------|----------------|----------------------|---------|
| | | | | 機体数 | 種別数 |
| January 2020 | 1,830 | 393,945 | 8,084 | 1067 | 182 |
| February 2020 | 1,644 | 323,611 | 6,535 | 920 | 148 |
| March 2020 | 1,469 | 287,713 | 6,386 | 822 | 91 |
| April 2020 | 1,099 | 173,303 | 3,345 | 589 | 80 |
| May 2020 | 1,287 | 255,080 | 4,685 | 799 | 88 |
| Jun 2020 | 1,244 | 254,988 | 5,512 | 780 | 84 |

①The comparison results aggregated on a semi-annual basis are as follows.

Compared to the first half / second half of 2019 in the first half of 2020

○The number of communications for both ADS-C and CPDLC has decreased by about 35%.

○The number of airlines (OP CODE) using Fukuoka FIR has also decreased by about 30% (100 aircrafts).

○The number of aircraft handled has decreased by about 10% (100 machines).

②The monthly comparison results for the first half of 2020 are as follows.

○Both ADS-C CPDLC decreaseing peaked in April and are on a recovery trend.

(In the normal year, it peaks in February and tends to rise.)

○The number of airlines (OP CODE) is large in February and March, and there is no recovery trend.

○The number of aircraft shows the same tendency as ADS-C / CPDLC.

Summary of the report

- 1) The overall PBCS monitoring result at Fukuoka FIR has not changed significantly from the previous year. On the other hand, Data link traffic had been increasing for the last few years, however this year it has decreased significantly due to the impact of COVID-19 (Corona).
- 2) ASP deterioration of some specific airlines and some specific AC-type has been observed. NPAC is doing performance assessment as monthly, if there is a significant data changing, Network Performance Assessment Center(NPAC) will report it via CRA.
- 3) We examined the aircraft that showed performance deterioration, there were several aircraft that were not equipped with "P2 (CPDLC RCP240)".
- 4) Due to data volume decreasing for decrease in traffic, there is a tendency for ASP to deteriorate on a monthly basis, but most of them satisfy the ASP performance in the semi-annual total.
- 5) It seems that performance degradation aircraft with "P2 (CPDLC RCP240)" equipped with "J7 (CPDLC FANS 1 / A SATCOM (Iridium))" has been influenced by a media transition to VHF / HF. However, there are some aircraft that satisfy the performance even under the same conditions (same OP CODE / same model).

Any Questions?

Thank you!



Technical Management
Center



Network Performance
Assessment Center



Air Traffic Management
Center

Reference information

① Satellite ID List

② Inmarsat GES ID & Inmarsat Coverage

②Satellite ID List

| Satellite | GES Location | Region | SITA | ARINC |
|--------------|-------------------------------------|------------|------|-------|
| Inmarsat I-3 | Burum, Netherlands | AORE | AOE6 | XXN |
| | Laurentides, Canada | AORW | AME2 | XXW |
| | Burum, Netherlands Fucino, Italy | IOR | EUA2 | XXI |
| | Perth, Australia | POR | APK2 | XXP |
| Inmarsat I-4 | Fucino, Italy | EMEA | EUA1 | XXF |
| | Burum, Netherlands | EMEA (SBB) | EME9 | XXB |
| | Paumalu, Hawaii | AMER | AME1 | XXH |
| | | AMER (SBB) | AMR9 | XXU |
| | | APAC | APK1 | XXA |
| | | APAC (SBB) | PAC9 | XXS |
| Iridium | Phoenix, Arizona | Global | IGW1 | IG1 |
| MTSAT | Kobe and Hitachi-ota | Japan | MTS1 | - |

- 1)The gray line shows the GSID that has not been used in Fukuoka FIR.
 2)XXA was operated as XXQ (Perth, Australia) from 17th Jun to 24th Aug.
)MTSAT has ended service on 31st Jan.

② Inmarsat GES ID & Inmarsat Coverage

